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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

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08 February 1999 (08.02.99)

International application No.

PCT/SE98/00941

Applicant's or agent's file reference

CASE 43699

International filing date (day/month/year)

20 May 1998 (20.05.98)

Priority date (day/month/year)

23 June 1997 (23.06.97)

Applicant

EDSTRÖM, Tomas

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

13 January 1999 (13.01.99)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was



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made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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Telephone No.: (41-22) 338.83.38

REC'D 05 JUL 1999

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Applicant's or agent's file reference CASE 43699	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE98/00941	International filing date (day/month/year) 20.05.1998	Priority date (day/month/year) 23.06.1997
International Patent Classification (IPC) or national classification and IPC ₆ B 65 B 57/02, G 01 B 3/12		
Applicant Sunds Defibrator Industries AB et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 13.01.1999	Date of completion of this report 18.05.1999
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88 Form PCT/IPEA/409 (cover sheet) (January 1994)	Authorized officer Kristina Pederson Telephone No. 08-782 25 00

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17978
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE98/00941

I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

☒ the international application as originally filed.

☐ the description, pages _____, as originally filed,
 pages _____, filed with the demand,
 pages _____, filed with the letter of _____,
 pages _____, filed with the letter of _____.

☐ the claims, Nos. _____, as originally filed,
 Nos. _____, as amended under Article 19,
 Nos. _____, filed with the demand,
 Nos. _____, filed with the letter of _____,
 Nos. _____, filed with the letter of _____.

☐ the drawings, sheets/fig _____, as originally filed,
 sheets/fig _____, filed with the demand
 sheets/fig _____, filed with the letter of _____,
 sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE98/00941

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-5</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-5</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-5</u>	YES
	Claims		NO

2. Citations and explanations

The present invention relates to means for binding wire around objects, for example bales of fibre material.

The binding means comprises a unit for feeding and stretching the wire. The measuring of fed wire length takes place in a separate measuring device where the measuring is carried out without the measuring means feeding the wire.

The documents cited in the International Search report represent the state of the art. None of these documents or any relevant combination thereof, reveals any means as described in claims 1-5.

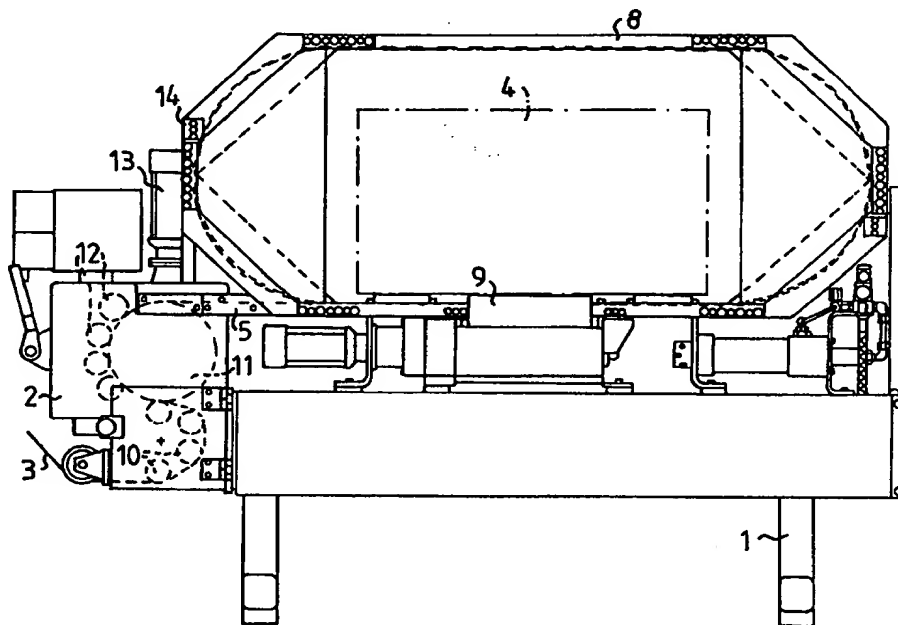
Therefore, the claimed invention as in claims 1-5 is novel and considered to involve an inventive step and to have industrial applicability.



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B65B 57/02, G01B 3/12	A1	(11) International Publication Number: WO 98/58843 (43) International Publication Date: 30 December 1998 (30.12.98)
(21) International Application Number: PCT/SE98/00941 (22) International Filing Date: 20 May 1998 (20.05.98) (30) Priority Data: 9702406-1 23 June 1997 (23.06.97) SE (71) Applicant (for all designated States except US): SUNDS DEFIBRATOR INDUSTRIES AB [SE/SE]; S-851 94 Sundsvall (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): EDSTRÖM, Tomas [SE/SE]; Vedetbåtsvägen 11, S-865 51 Ankarsvik (SE). (74) Agent: SUNDQVIST, Hans; Sunds Defibrator Industries AB, Strandbergsgatan 61, S-112 51 Stockholm (SE).		(81) Designated States: BR, CA, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>

(54) Title: BINDING MEANS



(57) Abstract

A means for binding wire around an object. The means comprises a feeding unit (2) with a feeding wheel (11) for feeding and stretching the wire (3). The measuring of fed wire length normally takes place in that the feeding wheel (11) rotates through a predetermined number of revolutions. Sliding between the wire (3) and feeding wheel (11), however, implies that the position of the wire cannot be determined accurately. As a solution of this problem a separate measuring means (5) is provided for continuously measuring the fed wire length (3), where the measuring is carried out without the measuring means (5) feeding the wire (3).

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Binding means

This invention relates to a means for binding wire around objects, for example bales of fiber material.

Pulp bales are bound around both individually and in the form of stacked units comprising a certain number of bales, usually six or eight bales. Such a unit load has a weight of between one and two tons. The strength of the wire binding tying together the unit load, therefore, is very important from a safety point of view, because several persons may stand near the load while it is being lifted by its wires. The equipment used for tying the knot in a bound wire loop and the knot itself, therefore, are subject of very comprehensive safety regulations and stringent safety controls.

The binding means comprises a unit for feeding the wire from a wire magazine through an openable wire guide bar around the object.

The feeding unit is used also for stretching the wire. The means comprises further a twining member, which includes a unit for locking the wire end, a unit for tying a wire knot, a cutting unit and a unit for projecting the knot.

The wire guide bar extends around the object to be bound and guides the wire at its feed. The wire is fed through the twining member around the object to be bound. When the free end of the wire arrives for the second time at the twining member, the wire is stopped and retained in the locking unit, whereafter the wire is stretched by reversing the feeding unit. The wire guide bar is thereby opened, and the wire is tightened around the object to be bound. The knot is tied, the wire is cut and projected out of the twining member.

In order to achieve an optimum binding and knot-tying result, the correct length of wire

must be fed. The wire normally is fed by means of a feeding wheel, which rotates through a predetermined number of revolutions and is driven, for example, by an electric servomotor. The feeding wheel is used also for stretching the wire.

In the wire magazine, on the path of the wire from the wire magazine to the feeding wheel, and in the wire guide bar, however, the wire can jam, whereby sliding can be caused between the feeding wheel and wire. Problems can also arise by variations in the wire quality, in its thickness and hardness, which result in sliding between the feeding wheel and wire.

The sliding creates problems during the feeding. The positions of the wire then cannot be determined, which may cause breakdowns. When then for avoiding sliding the contact pressure from the counter-pressure rolls is increased, there is risk of wire deformation whereby the feed of the wire through the different units in the binding means is made difficult.

The present invention offers a solution of the aforesaid problems, in that the measuring of the fed wire length takes place in a separate measuring means, which is not affected by sliding in the feeding wheel.

The characterizing features of the invention are apparent from the attached claims.

The invention is described in greater details in the following, with reference to the accompanying drawings illustrating an embodiment thereof.

Fig. 1 shows a binding machine.

Fig. 2 shows the measuring means.

The binding means is of the type shown and described in the patent SE 380 496 and in the patent application SE 9303380-1.

The binding means comprises a stand 1 on which the various units are arranged. A feeding unit 2 is provided to feed binding wire 3 in the form of steel wire from a wire magazine around an object 4 to be bound and thereafter to stretch the wire.

A measuring means 5 is provided for continuously measuring the fed wire length. The measuring is carried out without the measuring means 5 feeding the wire.

The measuring means 5 preferably comprises a runner 6, which abuts the wire 3, and a preferably compressed-air loaded dolly roll 15 to ensure that the wire 3 and runner 6 are in contact with each other.

The runner 6 has a contact surface 16, preferably with substantially straight profile. The measuring result is thereby less depending on the wire quality and varying contact pressure.

The runner 6 is coupled to a rotation meter 7, for example an inductive transmitter or a potentiometer, but preferably a pulse transmitter, which measures how much the runner 6 has rolled and, thereby, how much wire has passed the measuring means 5.

A wire guide bar 8 extends about the object to be bound 4. A twining member 9 comprises a guide bar for guiding the wire through the twining member, a unit for locking the wire end, a unit for tying a wire knot, a unit for cutting the wire, and a unit for projecting the completely tied knot.

The entire binding means preferably is movable so that it can be placed in a transport path for the objects to be bound and upon demand easily be exchanged.

The feeding unit 2 comprises guide wheels 10, about which the wire 3 runs, and a driven feeding wheel 11, to which counter-pressure rolls 12 abut. The feeding wheel 11 preferably is driven by an electric servomotor 13.

At the start of the binding machine the end of the wire 3 is positioned with the help of the values from the measuring means 5 to a pre-determined starting position for a binding sequence.

At the wire feed, the feeding unit 2 is driven by the electric servomotor 13, so that a pre-determined length of wire 3 is fed about the object to be bound 4, and the wire end arrives at the locking unit in the twining member 9. The fed wire length is measured by the measuring means 5. The wire end is retained in the twining member 9.

The wire stretching takes place thereafter by reversing the servomotor 13 of the feeding unit 2 until the wire has been stretched down onto the object to be bound 4, and the speed of the wire is zero. The wire movement is measured, for example, by a pulse transmitter in the servomotor 13, but preferably by the measuring means 5.

The wire guide bar 8 is openable and provided with grooves for the wire 3. During the wire feed, the bar 8 is held in closed position by piston/cylinder units 14, preferably pneumatic ones. At the wire stretching, the wire guide bar 8 is opened by the piston/cylinder units 14.

After the wire stretching, the units of the twining member 9 for twining, cutting and projecting the completed wire knot start to operate.

After the cutting, the wire is drawn back a predetermined length to the starting position for the next binding sequence by the feeding unit 2, which is controlled by values from the measuring means 5. The binding means is now ready for a new binding operation.

The correct length of fed wire is ensured in that the wire 3 free of sliding drives the runner 6 of the measuring unit which via the rotation meter 7 transfers the measuring values for controlling the wire feed. Since the moment of inertia in the runner 6 is small in relation to transferred moment between the wire 3 and runner 6, no sliding occurs between the wire 3 and runner 6. The accuracy and operational safety of the binding means can in this way be increased. If in spite thereof sliding should occur, this would only mean that a little too much wire is fed, which does not negatively affect the operational safety.

The invention, of course, is not restricted to the embodiments shown, but can be varied within the scope of the claims with reference to the descriptive part and drawing.

Claims

1. A means for binding wire around an object, comprising a feeding unit (2) with a feeding wheel (11) for feeding and stretching the wire (3), characterized in that it comprises a separate measuring means (5) for continuously measuring the fed wire length (3), where the measuring is carried out without wire (3) being fed by the measuring means (5).
2. A means as defined in claim 1, characterized in that the measuring means (5) comprises a runner (6) with a contact surface (16), which abuts the wire (3).
3. A means as defined in claim 2, characterized in that the contact surface (16) has a substantially straight profile.
4. A means as defined in claim 2 or 3, characterized in that the measuring means (5) comprises a dolly roll (15) for ensuring that the runner (6) and wire (3) abut each other.
5. A means as defined in claims 2, 3 or 4, characterized in that the runner (6) is coupled to a rotation meter (7).

1/1

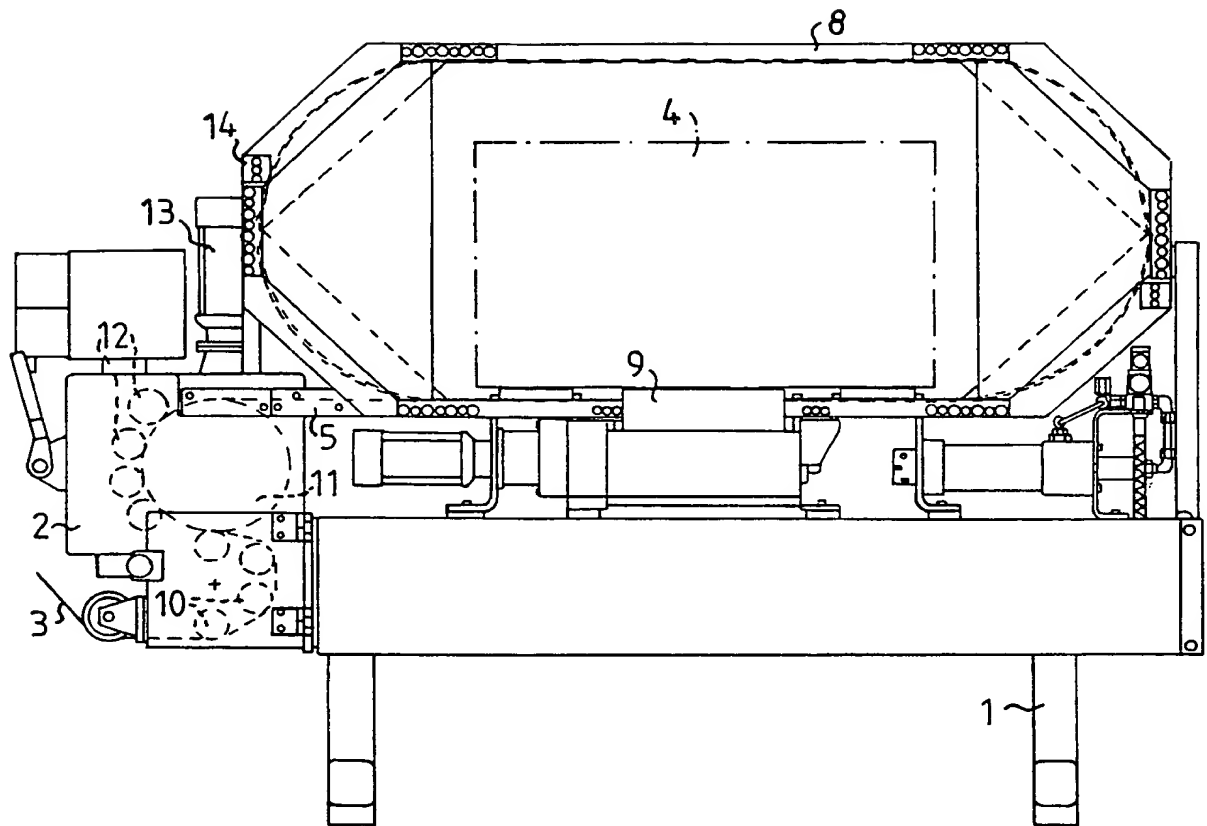


FIG. 1

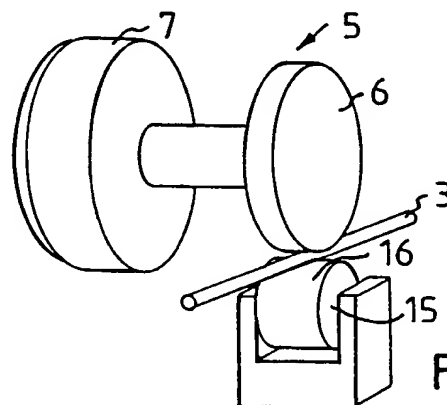


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/00941

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B65B 57/02, G01B 3/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL, EDOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 1388385 A (SMITHS INDUSTRIES LIMITED), 26 March 1975 (26.03.75) --	1-5
A	US 5177446 A (BORIANI ET AL), 5 January 1993 - (05.01.93) --	1-5
A	US 5299407 A (SCHUTTLER ET AL), 5 April 1994 (05.04.94) -----	1-5

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

25 August 1998

Date of mailing of the international search report

28-08-1998

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INTERNATIONAL SEARCH REPORT

Information on patent family members

27/07/98

International application No.

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Patent document cited in search report			Publication date	Patent family member(s)		Publication date
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				AU	654380 B	03/11/94
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